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Dixon

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[54] **PASSENGER TRAY TABLE WITH INGRESS/EGRESS POSITION**

[75] Inventor: **Richard W. Dixon**, Winston-Salem, N.C.

[73] Assignee: **Burns Aerospace Corporation**, Winston-Salem, N.C.

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[51] **Int. Cl.**[6] **A47B 39/00**

[52] **U.S. Cl.** **297/145**; 297/150; 297/162

[58] **Field of Search** 297/145, 149, 297/150, 161, 162, 188.15, 188.16, 188.17

[56] **References Cited**

U.S. PATENT DOCUMENTS

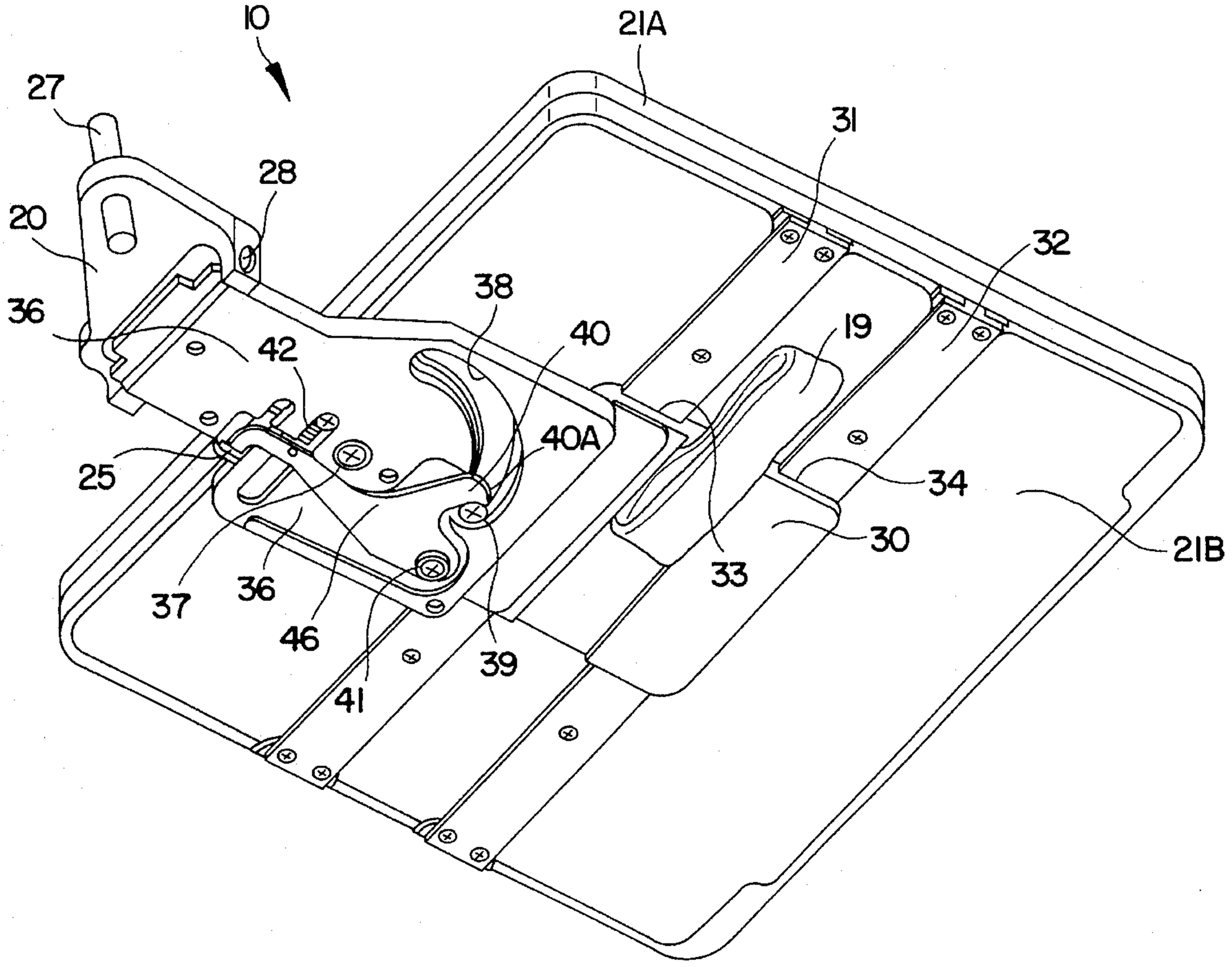
137,738	4/1873	Trevitt	297/150 X
1,217,231	2/1917	Soper	297/150 X
3,506,304	4/1970	Smittle et al.	297/162
4,852,940	5/1989	Kanigowski	297/145
5,087,096	2/1992	Yamazaki	297/145
5,193,765	3/1993	Simpson et al.	297/145 X
5,195,709	3/1993	Yasushi	297/188.16 X
5,275,482	1/1994	Grant	312/223.3 X

Primary Examiner—Peter R. Brown
Assistant Examiner—David E. Allred
Attorney, Agent, or Firm—W. Thad Adams, III, P.A.

[57] **ABSTRACT**

A stowable seat tray table for use with a seat, such as a passenger seat, having a tray table stowage compartment on one side of the seat. The tray table includes a tray table having a long side and a perpendicular short side with the table connected to a seat for permitting the table to be moved into and out of the stowage compartment. The table pivots and translates. The pivot movement and the translating movement permit the table to be moved when out of the stowage compartment between a use position wherein the long side of the table extends across the seat from one side to an opposing side for use by the occupant and an ingress/egress position wherein the table is pivoted about a vertical axis and laterally translated towards the stowage compartment to provide sufficient room for the passenger to ingress or to egress from the seat.

7 Claims, 9 Drawing Sheets



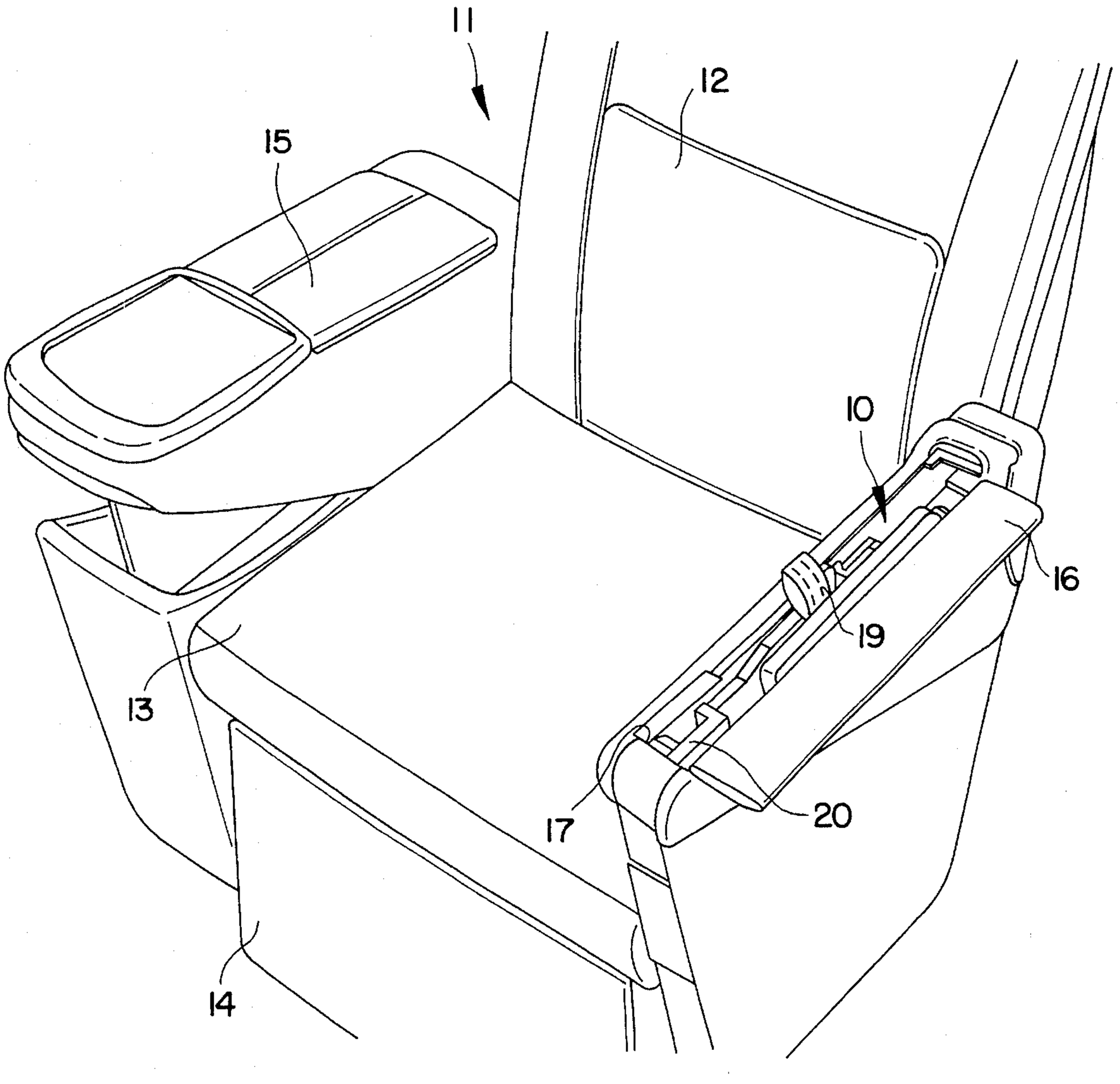


FIG. 1

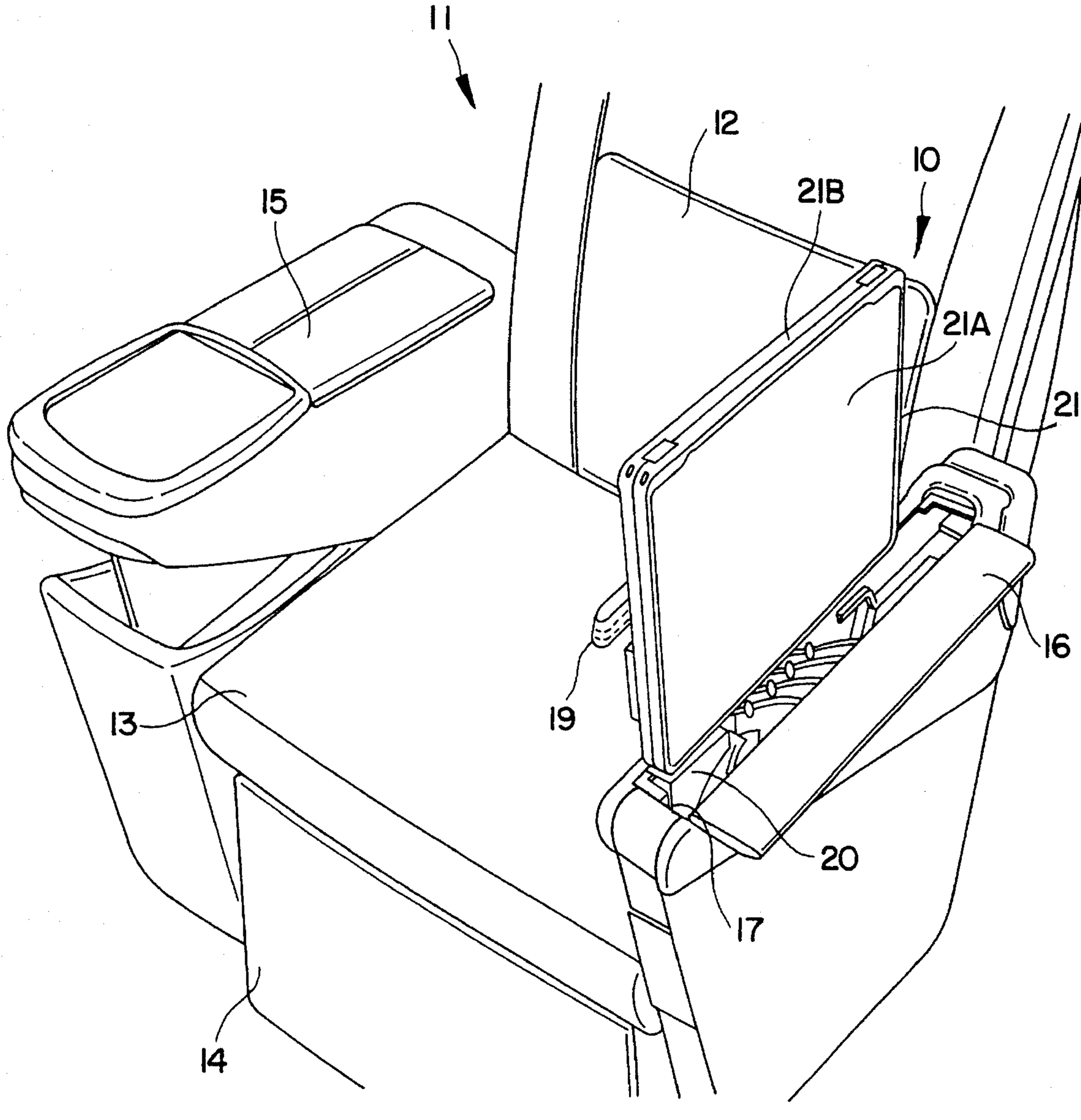


FIG. 2

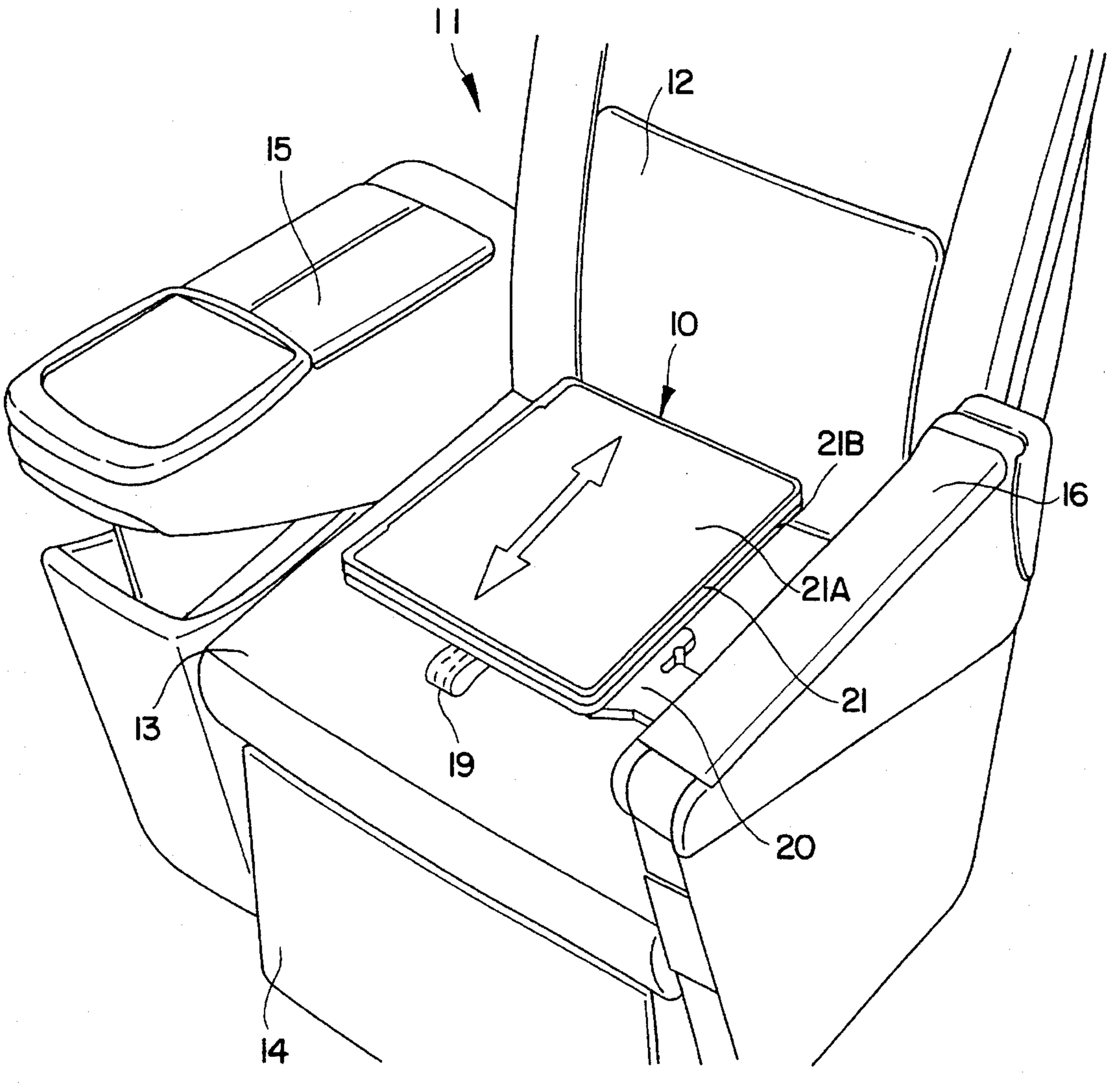


FIG. 3

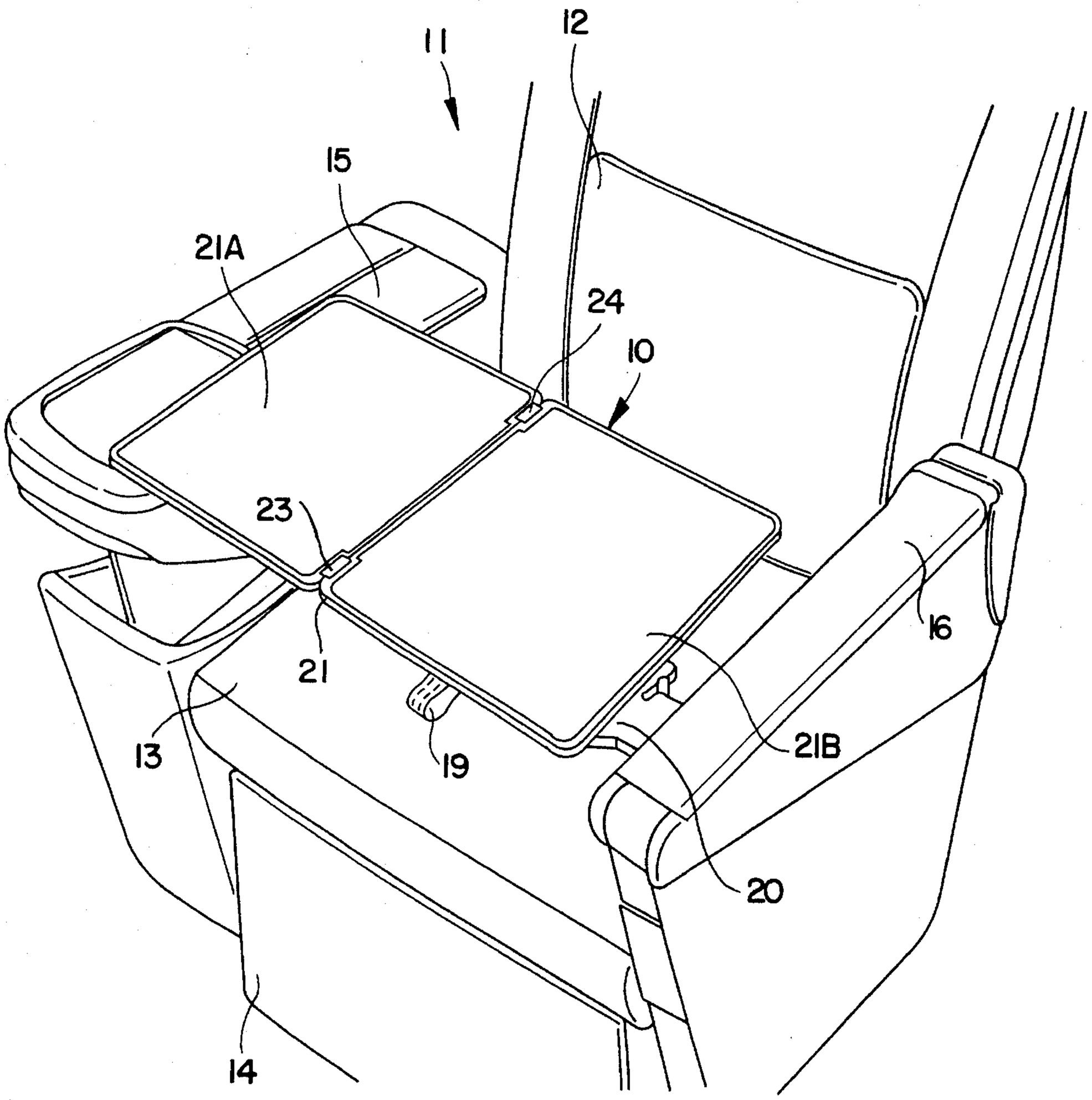


FIG. 4

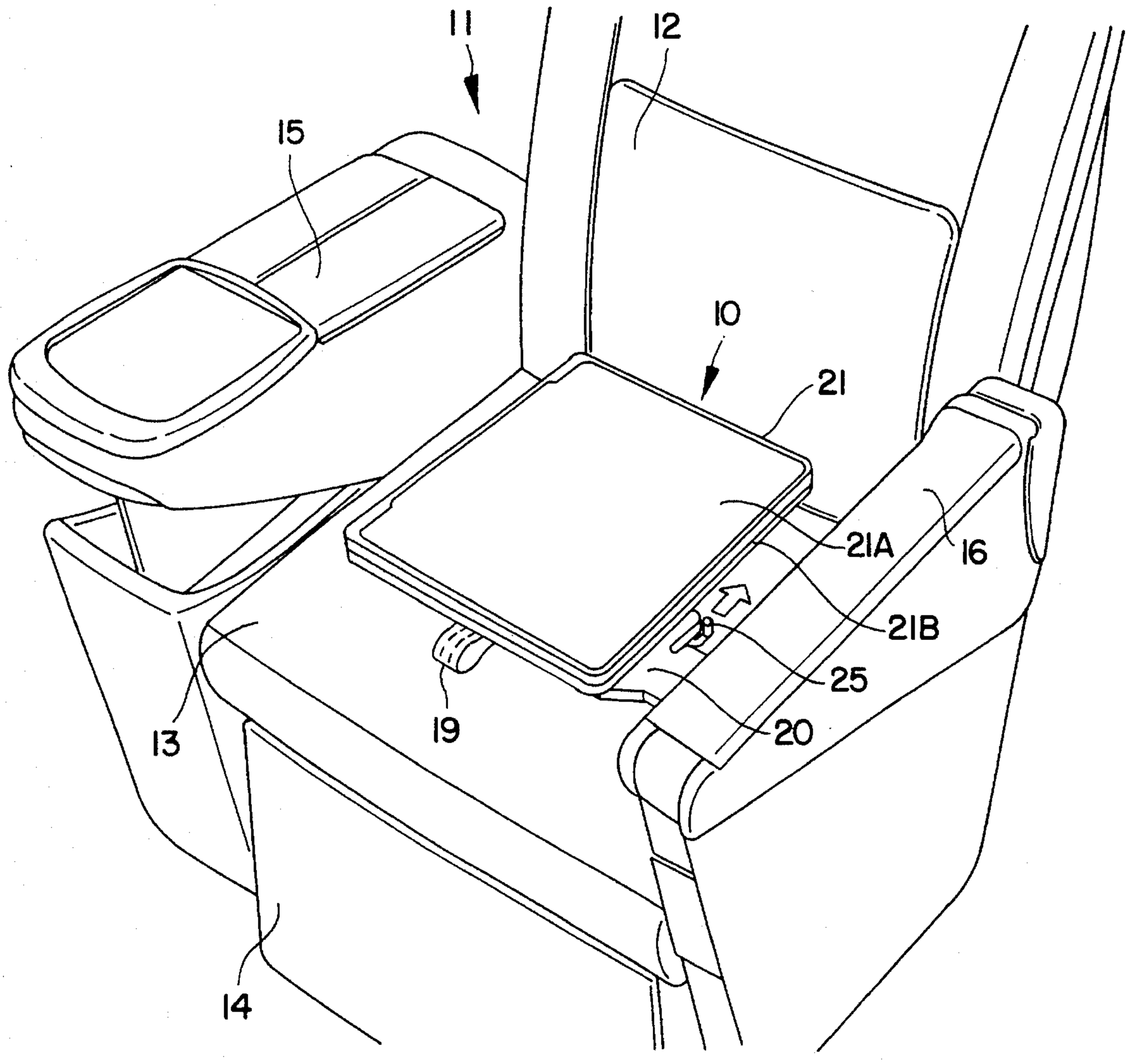


FIG. 5

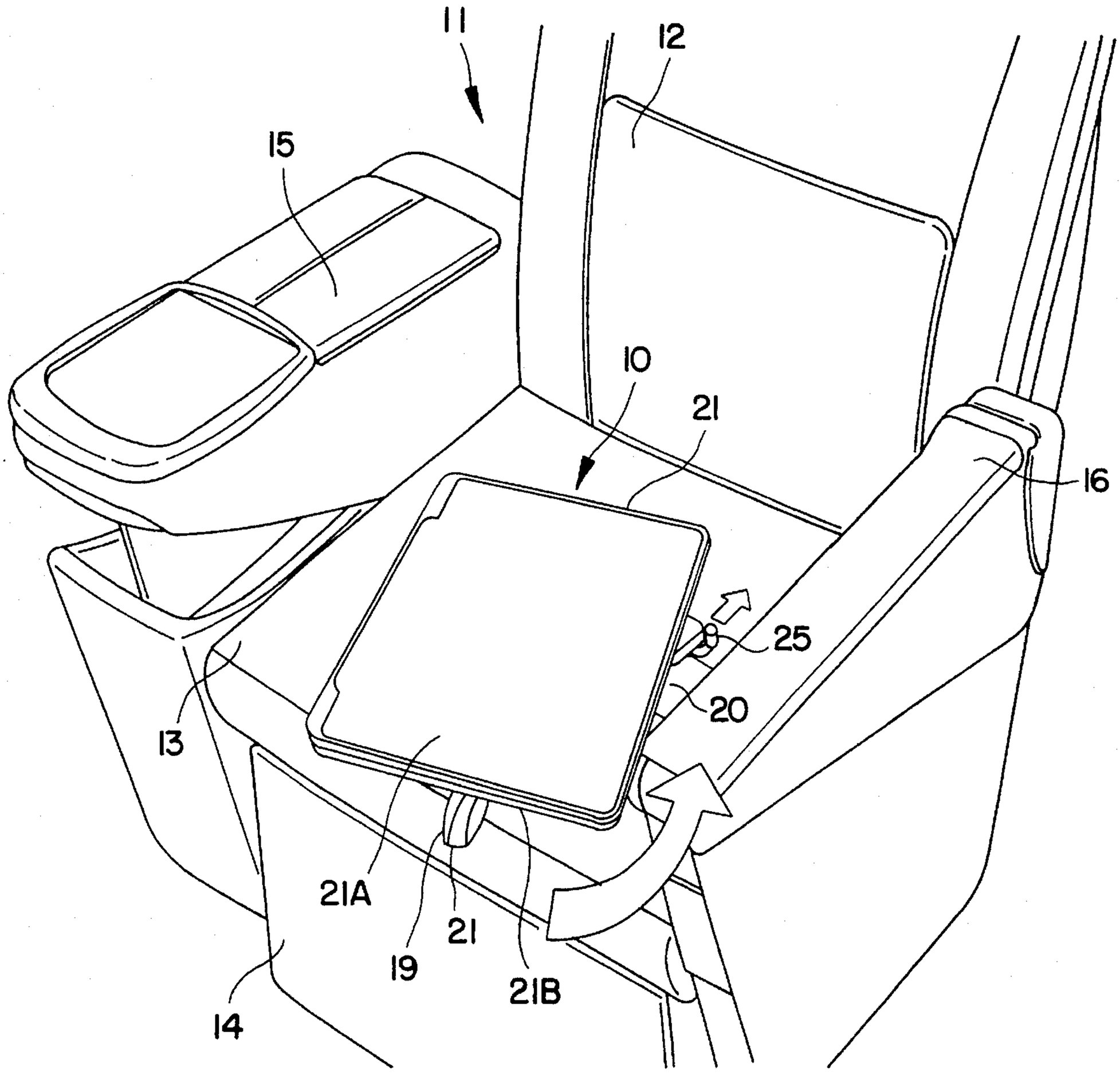


FIG. 6

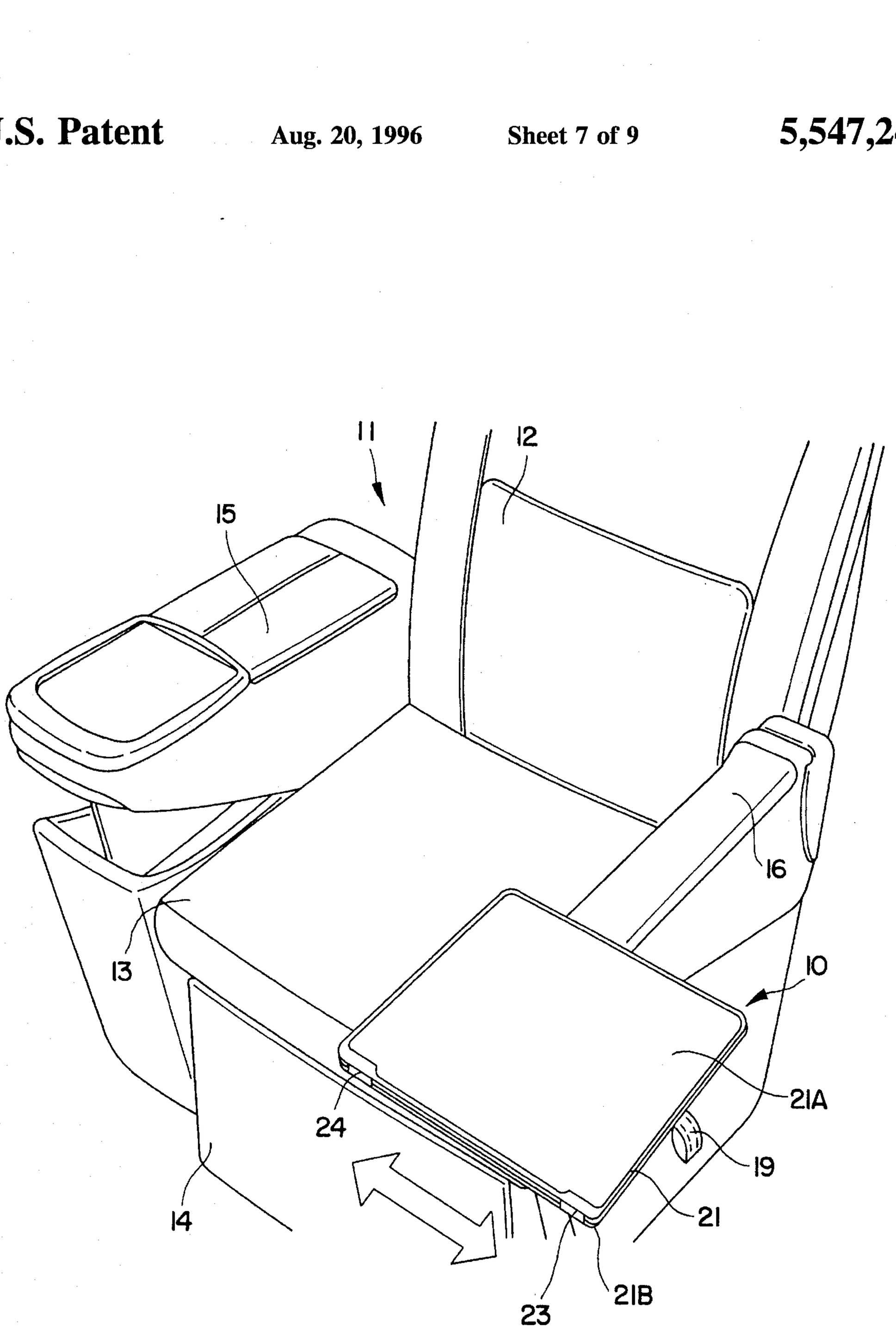
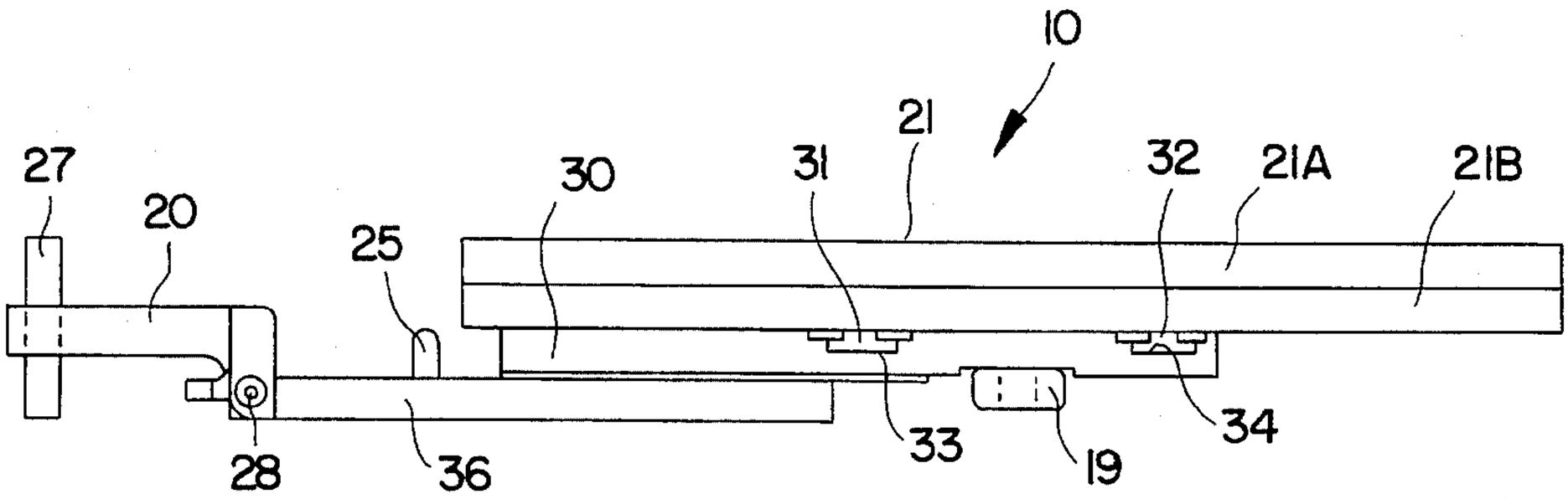


FIG. 7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21
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21A
21B
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FIG. 8

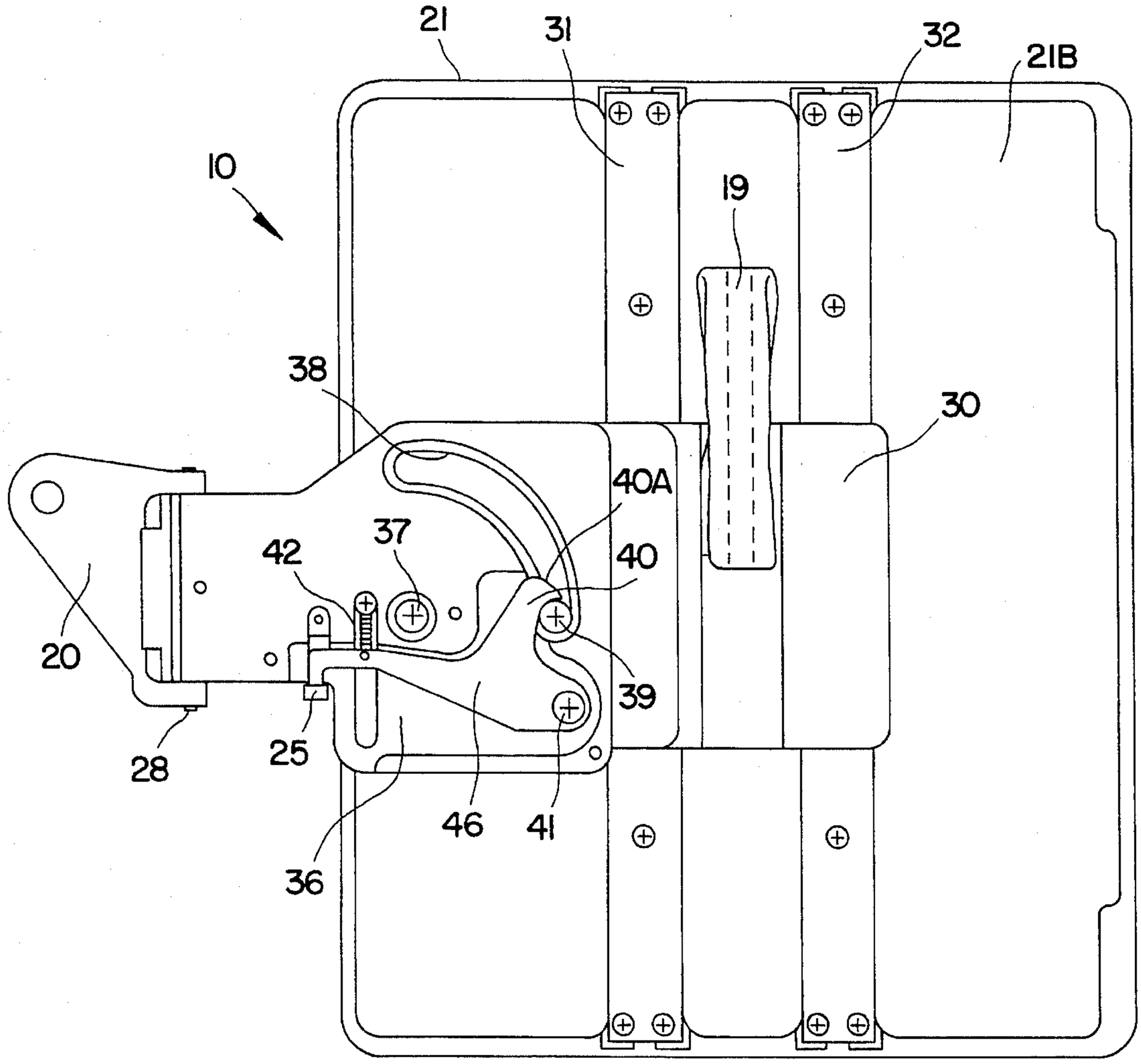
21
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FIG. 9

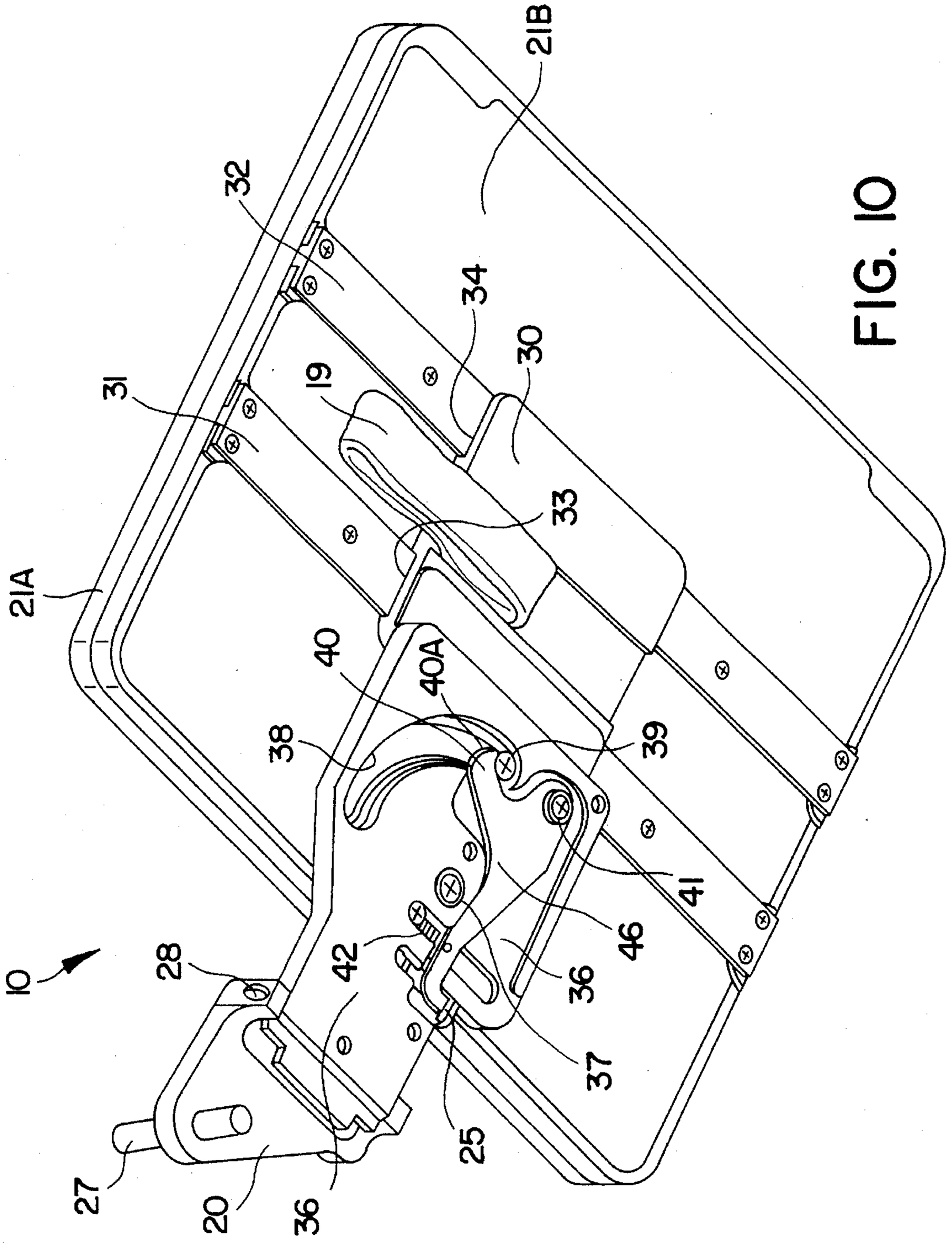

FIG. 10

PASSENGER TRAY TABLE WITH INGRESS/EGRESS POSITION

TECHNICAL FIELD AND BACKGROUND OF THE INVENTION

This invention relates to a passenger seat tray table which has the capability to be easily and quickly moved from its normal use position in front of the passenger to a side position to permit easy egress and ingress without stowing the table. The table is the type which is stowed in a side compartment of the seat, usually under one of the armrests with the compartment cover being the armrest. The ingress/egress position also permits the table to function as a "cocktail" table of sufficient size to hold a drink glass and small plate, while leaving the area in front of the passenger open so that the passenger can cross his or her legs, or hold a book or newspaper without interference from the table. The table can also be moved into a position sufficiently out of the way so that neighboring passengers can move past without the table being stowed in the armrest compartment.

Prior art U.S. Pat. No. 4,944,552 to Harris and U.S. Pat. No. 4,852,940 to Kanigowski permit only limited movement of the table out of the passenger's way, and even then the table extends further out into the area in front of the passenger, making movement past the seat by another passenger difficult or impossible. These patents also disclose tables which have relatively small parts which are subject to breakage and wear.

SUMMARY OF THE INVENTION

Therefore, it is an object of the invention to provide a seat tray table which has a use position and an ingress/egress position.

It is another object of the invention to provide a seat tray table which pivots from a use position into a ingress/egress position, in which position the tray can also serve as a small cocktail table.

It is another object of the invention to provide a seat tray table which permits movement past the seat by neighboring passengers while the table is in the ingress/egress position.

It is another object of the invention to provide a seat tray table which is moved to an ingress/egress position by a combination pivot and slide mechanism.

It is another object of the invention to provide a seat tray table which has an adjustable ingress/egress position.

These and other objects of the present invention are achieved in the preferred embodiments disclosed below by providing a stowable seat tray table for use with a passenger seat having a tray table stowage compartment on one side of the seat. The tray table includes a table top having a long side and a perpendicular short side with connecting means for connecting the table to a seat and for permitting the table to be moved into and out of the stowage compartment. The connecting means includes table pivot means and table translating means. The pivot means and the table translating means cooperate with the table for moving the table when out of the stowage compartment between a use position wherein the long side of the table extends across the seat from one side to an opposing side for use by the passenger and an ingress/egress position wherein the table is pivoted about a vertical axis by the pivot means and laterally translated towards the stowage compartment by the translating means to provide sufficient room for the passenger to ingress to or egress from the seat.

According to one preferred embodiment of the invention, the tray table is comprised of two table top sections hinged along an axis perpendicular to the long side of the table for permitting the table to be folded for stowage and for use as a small cocktail table.

According to another preferred embodiment of the invention, the table includes locking means cooperating with the table pivot means for locking the table in the use position.

According to yet another preferred embodiment of the invention, the table pivot means comprises a mounting block attached to a bottom surface of the table, a pivot block pivotally mounted on the mounting block, and an arcuate guide slot formed in the pivot block. A guide pin is mounted on the mounting block in a fixed position and extends upwardly into the guide slot for limiting pivotal movement of the pivot block to the arc of the arcuate guide slot.

According to yet another preferred embodiment of the invention, the locking means comprises a hook for holding the guide pin in a predetermined locked position in the guide slot.

According to yet another preferred embodiment of the invention, the hook is pivotally mounted on the pivot block and includes biasing means for biasing the hook over the guide slot in an interference position with relation to the guide pin.

Preferably, a predetermined force on the hook overcomes the biasing means and moves the pin past the hook into the locked position.

According to yet another preferred embodiment of the invention, the locking means includes an unlocking lever carried by the hook for releasing the guide pin from its locked position in the guide slot.

According to yet another preferred embodiment of the invention, the mounting block is mounted on the bottom surface of the table for translational movement relative to the table.

According to yet another preferred embodiment of the invention, the table includes slide means carried on the bottom surface of the table for carrying the mounting block for translational movement of the mounting block along the slide means.

According to yet another preferred embodiment of the invention, the slide means comprises first and second parallel tracks mounted to the bottom surface of the table, and the mounting block includes first and second parallel-extending channels within which the parallel tracks are mounted for sliding, translational movement.

BRIEF DESCRIPTION OF THE DRAWINGS

Some of the objects of the invention have been set forth above. Other objects and advantages of the invention will appear as the invention proceeds when taken in conjunction with the following drawings, in which:

FIG. **1** is a partial perspective view of a passenger seat including a seat tray table enclosed in a compartment in one of the seat armrests;

FIG. **2** is a view according to FIG. **1** showing movement of the tray table from the armrest compartment;

FIG. **3** is a view according to FIG. **1** showing further movement of the tray table from the armrest compartment into a first use position;

FIG. **4** is a view according to FIG. **1** showing movement of the tray table from the first use position into the second

use position completely across the seat from one side to the other;

FIG. **5** is view according to FIG. **1** showing movement of the unlocking lever to permit movement of the tray table from the first use position into the ingress/egress position;

FIG. **6** is a view according to FIG. **1** showing movement of the tray table from the first use position into the ingress/egress position;

FIG. **7** is a view according to FIG. **1** showing translational movement of the tray table from a first ingress/egress position into a second ingress/egress position;

FIG. **8** is a side elevation of the tray table;

FIG. **9** is a bottom plan view of the tray table; and

FIG. **10** is a perspective bottom view of the tray table.

DESCRIPTION OF THE PREFERRED EMBODIMENT AND BEST MODE

Referring now specifically to the drawings, a seat tray table according to the present invention is illustrated in FIG. **1** and shown generally at reference numeral **10**. Tray table **10** is shown mounted in a passenger seat **11**, which may be one of many types of seats intended for use in aircraft, buses and other transportation modes. Furthermore, even though referred to as a tray table for use with a passenger seat, the seat could be used for other purposes, such as in theaters. The tray table **10** is referred to as being for use in a passenger seat because that is its principal intended use.

The tray table **10** shown in the drawings is a left-hand version, but operates the same in both left-hand and right-hand versions. Thus, the description below, while of a left-hand version, is applicable to both left and right-hand versions. As the description proceeds, the general functions of the seat **11** will be explained (FIGS. **1–7**), followed by a more detailed explanation of how the functions result from the design of the tray table **10** (FIGS. **8–10**).

Seat **11** includes a seat back **12**, a seat bottom **13**, a foot rest **14**, a center armrest **15**, and an aisle armrest **16**. The aisle armrest **16** is hinged and swings open, as shown in FIG. **1**, to reveal a seat tray table stowage compartment **17** which holds the tray table **10** in its stowed position. In other seat configurations the tray table **10** may be stored in center armrests, as in triple seats.

To use the tray table **10**, a loop **19** positioned on the top edge of the tray table **10** when stowed is grasped with the right hand and pulled upwardly and forwardly. Tray table **10** pivots from the stowage compartment **17** on a laterally-extending pivot assembly **20** which connects the tray table **10** to the seat **11**, revealing a table top **21**, which is formed of a pair of table top sections **21**A and **21**B. A hook (not shown) may be integrally formed with or attached to pivot block **36** in substitution for the loop **19**.

When the table top **21** reaches the position shown in FIG. **2**, the table top **21** has been pivoted 90° (note that the loop **19** is now on the front of the table top **21**) and can be pivoted downwardly 90° into a use position, shown in FIG. **3**. At this point, the arm rest **16** is lowered into a position covering the compartment **17**.

The position shown in FIG. **3** comprises a first use position, and permits the seat occupant some mobility, for example to cross legs, while nevertheless having room for a drink, a book or some other small object. In this position, the table top **21** slides front-to-back, as shown by the arrows, so that the occupant can move the table closer or further away.

Referring now to FIG. **4**, the table top sections **21**A and **21**B are hinged along an axis perpendicular to the long side of the table top by hinge assemblies **23** and **24**. By pivoting the table top section **21**B away from the table top section **21**A, the tray table **21** becomes a full-length table suitable for dining or providing a work surface. The long side of the table top **21** extends transversely from one side of the seat to the other, and is sufficiently long to extend completely from one side of the seat **11** to the other, with the free end of the table top section **21**B being supported on edge of the armrest **15**. In this position, the table top **21** slides front-to-back, so that the occupant can move the table closer or further away, in exactly the same manner as with the table top **21** in the position shown in FIG. **3**.

Referring now to FIGS. **5–7**, the steps for moving the table top **21** into an ingress/egress position is illustrated. First, the table top section **21**B may be folded back onto the table top section **21**A, as shown if desired. Then an unlocking lever **25** is pulled by the occupant in the direction shown in FIG. **5**, which releases the table top **21** from its use position. As is shown in FIGS. **6** and **7**, the table top **21** is then permitted to pivot 90°, so that the long side of the table top sections **21**A and **21**B now extends front to back instead of transversely, as described above. If the table top **21** is in use, it may be pivoted without folding the section **21**B over onto section **21**A.

FIG. **7** illustrates the ingress/egress position. Within this position there exists a range of side-to-side translation motion which permits to the occupant to, for example, move the table top **21** completely to the side so that he or she can leave and return to the seat. Note that the table top **21** does not pivot into the access area in front of the seat when it is in its ingress/egress position. Therefore, passage of other passengers to and from their seat past the seat **11** is not impeded.

Now that the overall functions of the tray table have been explained, a more specific, detailed explanation of the construction of the tray table is illustrated in FIGS. **8–10**. The pivot assembly **20**, which connects the tray table to the seat **11**, includes a pivot pin **27** which attaches the entire tray table to the seat **11**. Pivot assembly **20** also includes a pivot pin **28** which pivots at right angles to pivot pin **27**, and which permits the table top **21** to be lowered from the position shown in FIG. **2** to the position shown in FIG. **3**.

The pivot assembly **20**, which connects the tray table to the seat **11** also includes a table translation assembly and a table pivot assembly for permitting independent pivotal and translational movement of the table top **21**.

The table translation assembly includes a mounting block **30** which is mounted by a pair of parallel tracks **31**, **32** which extend across the short side of the table top section **21**A from one side to the other. The tracks **31**, **32** are retained in slots **33**, **34** on the top surface of the mounting block **30**. Tracks **31**, **32** are fabricated of low-friction Delrin and permit easy movement of the table top **21** by applying light pressure to the front or rear of the table top **21** to move it in the desired direction. Nylon or other plastics may also be used.

This translational movement serves two separate functions. In the table configuration shown in FIGS. **3** and **4**, the movement of the table top **21** along the tracks **31**, **32** moves the table top **21** towards or away from the seat occupant. Thus, the occupant can adjust the seat to a dining or working distance, or adjust for body size.

In the ingress/egress position configuration shown in FIG. **7**, the table top **21** has been pivoted 90°. Thus, the same translational movement moves the table top **21** from side to

side. The position of the table top **21** on the side of the seat **11** enables the translational movement to move the table almost completely out of the way to permit the occupant to leave the seat and subsequently return to it. The table top **21** can also be positioned by the occupant to hold food or drink off to the side so that the seating is more comfortable. The degree of pivot can be limited to less than 90° if necessary due to user requirements.

The table pivot assembly includes the mounting block **30**. A pivot block **36** is pivotally mounted on the mounting block **30** by a pivot pin **37**. The pivot block **36** has an arcuate guide slot **38** into which extends a guide pin **39**. The guide pin **39** arrests movement of the table top **21** by engaging the ends of the guide slot **38** at the opposite extremes of travel. In the position of the guide pin **39** shown in FIGS. **9** and **10**, orientation of the table top **21** is such that the translation accomplished by the movement of the mounting block on the tracks **31**, **32** is towards and away from the occupant, as described above.

In this position, the table top **21** is locked, meaning that it cannot be pivoted merely by turning the table top **21** about a vertical axis defined by the pivot pin **37**. The locked position of the table top **21** is achieved by a hook **40** mounted on a pivot pin **41**. The hook **40** is biased in the locking position by a spring **42** connected by one end to the pivot block **36** and by the other end to the unlocking lever **25** of the hook **40**. As is best shown in FIGS. **9** and **10**, the hook **40** traps the guide pin **39** against one end of the guide slot **38**, locking the table top **21** into the use position.

As is shown in FIG. **9**, to release the lock the unlocking lever **25** is pulled towards the occupant. This movement overcomes the biasing force of the spring **42** and pulls the hook **40** away from the guide pin **39**, releasing it and permitting the occupant to then pivot the table top **21** as shown in FIGS. **6** and **7**. The table top **21** may be pivoted to the extent of the arc of the guide slot **38**, so that when the other end of the guide slot **38** reaches the stationary guide pin, pivotal movement of the table top **21** ceases.

To return the table top **21** to its locked, use position, the table top is pivoted in the opposite direction. When the guide pin **39** reaches the hook **40**, additional force is required to overcome the biasing force of the spring **42**. Note that the nose of the hook **40** has an oblique interference surface **40**A. When the guide pin **39** hits the interference surface **40**A, application of additional force against the oblique surface will push the hook **40** out of the way, permitting the guide pin **39** to reach the end of its travel against the end of the guide slot **38**. Once the guide pin **39** has passed the hook **40**, the spring **42** pulls the hook **40** back into the locking position.

The combination of the pivoting movement and the translating movement described above provides a very wide range of adjustment, so that the table top **21** can be moved into many different positions to suit the comfort and needs of the seat occupant.

A stowable seat tray table is described above. Various details of the invention may be changed without departing from its scope. Furthermore, the foregoing description of the preferred embodiment of the invention and the best mode for practicing the invention are provided for the purpose of illustration only and not for the purpose of limitation the invention being defined by the claims.

I claim:

1. A stowable seat tray table for use with a seat having a tray table stowage compartment on one side thereof, comprising:

(a) a tray table having a long side and a perpendicular short side;

(b) connecting means for connecting the table to the seat and for permitting the table to be moved into and out of the stowage compartment;

(c) said connecting means including table pivot means and table translating means, said pivot means and said table translating means cooperating with said table for moving the table when out of the stowage compartment between:

(1) a use position wherein the long side of the table extends across the seat from one side to an opposing side for use by an occupant; and

(2) an ingress/egress position at a substantially right angle to the use position wherein the table is pivoted about a vertical axis by the pivot means and laterally translated while remaining in the horizontal plane of the use position towards the stowage compartment by the translating means to provide sufficient room for the occupant to ingress to or egress from the seat without removing items from the tray;

(d) said table pivot means comprising:

(1) a mounting block attached to a bottom surface of the table;

(2) a pivot block pivotally mounted on said mounting block;

(3) an arcuate guide slot formed in said pivot block; and

(4) a guide pin mounted on said mounting block in a fixed position and extending upwardly into said guide slot for limiting pivotal movement of said pivot block to the arc of the arcuate guide slot; and

(e) said table including locking means cooperating with said table pivot means for locking the table in the use position, said locking means comprising a hook for holding the guide pin in a predetermined locked position in said guide slot.

2. A seat tray table according to claim **1**, wherein said tray table is comprised of two table top sections hinged along an axis perpendicular to the long side of the table for permitting the table to be folded for stowage and for use as a small cocktail table.

3. A seat tray table according to claim **1**, wherein said hook is pivotally mounted on said pivot block and includes biasing means for biasing said hook over the guide slot in an interference position with relation to said guide pin, and wherein a predetermined force on said hook by the pin overcomes said biasing means and moves the pin past the hook into the locked position.

4. A seat tray table according to claim **3**, wherein said locking means includes an unlocking lever carried by said hook for releasing said guide pin from its locked position in the guide slot.

5. A seat tray table according to claim **1**, wherein said mounting block is mounted on the bottom surface of said table for translational movement relative to said table.

6. A seat tray table according to claim **1**, and including slide means carried on the bottom surface of the table for carrying the mounting block for translational movement of the mounting block along the slide means.

7. A seat tray table according to claim **6**, wherein said slide means comprises first and second parallel tracks mounted to the bottom surface of the table, and wherein said mounting block includes first and second parallel-extending channels within which said parallel tracks are mounted for sliding, translational movement.

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